"HIGH SPEED CCD PHOTOMETRY OF THE P/SHOEMAKER-LEVY 9 - JUPITER COLLISION"

NAGW-4819

FINAL REPORT

Using the National Solar Observatory 64-inch Vacuum Tower Telescope at Sacramento Peak, we have obtained high spatial and time resolution images of Jupiter in the visible continuum at 5000 Å, in the 7250 Å and 8900 Å methane bands, plus their adjacent continuum bands (at 7500 Å and 9500 Å), before, during, and after the times of the collisions. In addition, with the use of a beam splitter, near-IR images (J-band) were also obtained simultaneously with a 256x256 NICMOS chip. The observations spanned the time period 14 - 25 July 1994, at intervals of several hours each day, depending on the weather and the visibility of Jupiter. The original proposal was to use the data to track the evolution of the impact clouds produced by impacts from comet Shoemaker-Levy 9.

The simultaneous observations in both the visible and the near-IR yielded 93,000 images and over 30 Gigabytes of data. Much of the efforts devoted to this project in 1995 - 1996 was spent on selecting the best images from the enormous database and developing the software to automate the data reduction process. The data selection is now complete and the selected data consist mostly of methane band images and J-band images. As expected, the methane band filters produced the best images of the impact clouds since they are sensitive only to the top layers of the atmosphere and suppress light from the lower layers.

We are still refining the automated data analysis software and finalizing the calibration of the images. The latter is an arduous problem since many of the images were made in daylight. We expect to finish these two tasks in early 1998, whereupon the analysis will proceed very quickly. Our goals remain unchanged. We will use lightcurves of the impact sites for the following goals:

(i) to monitor and understand the time variability of the optical depths of the impact clouds
(ii) to monitor and understand the time variability of the masses of the impact clouds
(iii) to monitor the wind speeds in the upper atmosphere of Jupiter.

Although there exist several lightcurves of the Shoemaker-Levy 9 impacts, most were taken in the infrared and optical lightcurves are relatively scarce (Ortiz *et al.* 1997, Astron. & Astrophys. **324**). We intend to partially rectify this situation with our observations of Shoemaker-Levy 9.